



Technology Deployment Summary Sheet

AIR CASTERS

Aero-Caster® Load Module System™

THE NEED

A large amount of Decontamination and Decommissioning (D&D) operations are being conducted throughout the DOE Complex. D&D operations often use heavy equipment to lift or remove large heavy items during the decommissioning process. It is often difficult or impossible to get heavy equipment into these facilities to remove heavy items, forcing workers to resort to physical labor to perform these tasks or make expensive modifications to facilitate rigging. Because of these difficulties, INEEL D&D operations expressed the need for a technology that could be used to remove two massive incinerator components from the Waste Experimental Reduction Facility (WERF). Current measures for removing the incinerator components involved making a hole in the roof and using a massive crane to lift the incinerator from the facility, then rebuilding the roof.

THE TECHNOLOGY

AeroGo Inc. manufactures standard and custom engineered products for moving large, heavy or delicate loads weighing 500 lbs. to 10,000 tons. One of the products is an Aero-Caster® Load Module System™ (see Top Left Figure) that can be used to literally float heavy loads on a frictionless film of air. The casters provide a clean, quiet and safe alternative for moving heavy loads. The casters come in sizes that range from 6 to 60 inches square. Four to 6 casters make up a typical system that is controlled using a control manifold (shown above). The control manifold is composed of individual control valves for each caster which allows the operator to adjust the airflow independently for each caster in order to balance the load with offset center of gravities. This system is ideal for moving heavy loads in areas where heavy lift equipment access or rigging is restricted.

THE DEPLOYMENT

D&D workers at the INEEL needed to remove the incinerator from WERF Incinerator Building (PBF-609). The incinerator was taken offline in October of 2000 and other methods of volume reduction are now being employed at the INEEL. The incinerator is composed of two six-foot diameter, 12 foot long cylindrical structures or tanks, one sitting on top of the other. The lower or primary structure weighs approximately 70,000 lbs. The upper or secondary structure weighs about 35,000 lbs. The incinerator was positioned in a room that had a basement below it. The floor loading of this room was at its limit with only the incinerators in place. This made it impossible to allow heavy equipment into the building to assist in removing the incinerator tanks. To remove the incinerator, workers originally planned to remove the roof from the building and use a crane to lift the two incinerator tanks from the building in at least 2 heavy lifts. Once the incinerator was removed, the roof would have to be rebuilt.



Moving the Primary Tank using the Air Casters



Pulling the Incinerator out of PBF 609 on Air Casters



AIR PALLETS

<http://id.inel.gov/lstdp>

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INEEL D&D operations, along with help for the Large Scale Demonstration and Deployment Project, found that by using the air casters, the incinerator components could be safely removed from the facility without exceeding the floor load limits. D&D workers were able to remove the incinerator from the facility without removing the roof and using a crane.

Two Aero-Caster ® systems were purchased, a heavy-duty 21-inch caster system and, a heavy-duty 27-inch caster system. The 21-inch system is composed of 6 individual casters, each caster has a load range of 500 to 14,000 lbs. The 21-inch system can be used to move loads ranging from 2000 to 84,000 lbs. The 27-inch system is also composed of 6 individual casters. Each 27-inch caster has a load range of 2,200 to 5,000 lbs. minimum up to 24,000 lbs maximum. The 27-inch system has a load range of 10,000 lbs up to 144,000 lbs. Both the 21 and 27-inch systems require a maximum operating air pressure of 50-psig. The 21-inch system requires 315-scfm while the 27-inch system needs 420-scfm.

The 21-inch casters were used to move the secondary tank, which weighs about 35,000 lbs. The 27-inch casters were used to move the primary tank, which weighs about 75,000 lbs. In addition, the 21-inch casters were used to move a lifting framework used to lift the secondary tanks off the primary tank. The framework weighs about 5,000 lbs.

THE RESULTS

The casters were successfully used to transport a lifting framework into the WERF facility in preparation to remove the incinerator tanks. This framework was erected and used to lift the secondary tank off the primary tank. The primary incinerator tank was then placed on the 27-inch casters and moved out from under the secondary tank. The secondary tank was lowered and placed on the 21-inch casters. With the casters in place it took only a matter of minutes to pull the primary and secondary tanks out of the facility and stage them for disposal (see Figure below).

The tanks were pulled out of the facility across a paved blacktop surface. This type of surface is not an acceptable surface for the air casters because too much air can be lost on the uneven surface. To correct this, workers placed pieces of sheet metal on the pavement surface from the building to the staging area, thus allowing the tanks to be easily pulled to the staging area.

Using the casters to move the incinerator tanks out of WERF provided a significant cost saving over the baseline process. The baseline process involved removing a portion of the roof, bringing in a huge crane and lifting the tanks out of the building, and then rebuilding the roof. A direct cost saving of \$78,000 was realized as a result of using the casters. \$15,000 was associated with the budgeted cost of removing and replacing the roof. The cost of the casters was about \$12,000 for the 21-inch casters and about \$18,000 for the 27-inch casters. The casters can be used on future projects, further defraying the initial cost. In addition, the job was completed one month ahead of schedule resulting in an additional estimated \$132,000 saving. By using the casters, no workers were required to work in elevated areas removing and restoring the roof.

BENEFITS

- Increases worker safety – minimizes the need for work in elevated areas
- Decreases labor costs – no modifications to the roof were required
- Speeds up schedule – about one month was cut from the schedule
- The equipment is lightweight and easy to handle and makes the heavy components lifted easy to handle as well
- Reduces or eliminates the need for facility modifications to support the rigging of heavy objects
- Reduces the need to evaluate the effects of a heavy load drop during lifts
- Minimizes the use of heavy equipment

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Primary and Secondary Incinerator Tanks staged outside of WERF 609



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